

**SEQUENCE LISTING**

<110> Københavns Universitet  
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5 Pamela Magistrado  
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Trine Staalsø  
10 Lars Hviid  
Thor Theander  
Anja Jensen

<120> COMPOUNDS USEFUL IN THE DIAGNOSIS AND TREATMENT OF MALARIA  
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 Lys Gly Gln Gly Asp Gly Lys Asp Cys Thr Gln Lys Asp Lys Glu Cys

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	Pro Tyr Lys Ser Val Asn Thr Arg Asp Lys Arg Asp Ala Thr Asp Asp		
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	Thr Thr Pro Thr Val Tyr Ser Thr Ala Ala Gly Tyr Val His Gln Glu		
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	Pro Ser Thr Pro Asn Pro Cys Ala Glu Thr Gly Gly Val His Thr Ile		
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	Lys Thr Val Thr Asp Val Ala Lys Ile Leu Gln Gly Glu Ala Asn Glu		
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	Phe Asn Val Gly Thr Glu Trp Ser Phe Lys Asp Asn His Arg Lys Arg		
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	Thr His Pro Glu Ala Tyr Met Pro Pro Arg Arg Glu His Ile Cys Thr		
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	Ser Asn Leu Glu Tyr Leu Ile His Lys Arg Lys Lys Pro Ile Ile Glu		
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	Asn Asn Asp Ala Lys Arg Leu Gln Thr Asn Leu Lys Glu Ile Phe Thr		
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	1460	1465	1470
	Pro Tyr Leu Lys Leu Arg Ala Asp Trp Trp Glu Ala Asn Arg Ala Lys		
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	Val Trp Lys Ala Met Lys Cys Lys Thr Asn Gly Val Asp Ile Thr Cys		
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	Gln Pro Asp Asn Ser His Asp Ser His Met Pro Ala Ser Leu Asp Asp		
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	Glu Ala Leu Glu Lys Ser Gly Asp Thr Lys Ile Glu Asp Ile Ser Glu		
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	His Asp Arg Asp Leu Asn Ser Gly Glu Glu Ile Ser Tyr Asn Ile His			
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 45 <212> PRT  
 <213> Plasmodium falciparum

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 20 25 30  
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 35 40 45  
 55 Leu Lys Gly Lys Leu Ser Asn Ala Lys Phe Ala Asp Arg Leu Tyr Lys  
 50 55 60  
 Glu Ser Gly Gly Asp Leu Arg Ser Ala Tyr Ser Asp Ala Cys Ser Leu  
 65 70 75 80  
 Thr Tyr Lys Phe His Thr Asn Ile Thr Thr Asp Gly Gly Asp Gly Arg

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	His Pro Cys His Gly Arg Glu Asn Asn Arg Phe Ser Glu Ser Gln Glu		
	100	105	110
	Tyr Gly Cys Ser Asn Val Tyr Ile Lys Gly Asn Glu Asn Asn Ser Asn		
5	115	120	125
	Gly Thr Ala Cys Val Pro Pro Arg Arg Arg His Ile Cys Asp Gln Asn		
	130	135	140
	Leu Glu Phe Leu Asp Asn Pro His Thr Asp Asp Thr Asp Asp Leu Leu		
	145	150	155
10	Gly Asn Val Leu Val Thr Ala Lys Tyr Glu Gly Asn Tyr Ile Val Ser		
	165	170	175
	Asn His Pro Asp Lys Asn Ser Asn Gly Asn Lys Ser Gly Ile Cys Thr		
	180	185	190
15	Ser Leu Ala Arg Ser Phe Ala Asp Ile Gly Asp Ile Val Arg Gly Arg		
	195	200	205
	Asp Met Phe Lys Ser Asn Glu Lys Val Glu Ile Gly Leu Lys Lys Val		
	210	215	220
	Phe Glu Lys Ile Asn Asn Gly Leu Lys Lys Ile Gly Ile Asn Asp Tyr		
	225	230	235
20	Asn Asp Ile Ser Gly Asn Tyr Tyr Lys Leu Arg Glu Ala Trp Trp Thr		
	245	250	255
	Ala Asn Arg Asp Gln Val Trp Lys Ala Ile Thr Cys Arg Ala Pro Asn		
	260	265	270
25	Gly Ala Asn Tyr Phe Arg Lys Gly Leu Asp Gly Lys Ile Ile Phe Ser		
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	Asp Asn Gly Pro Cys Gly Arg Lys Glu Leu Ile Val Pro Thr Tyr Leu		
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	Asp Tyr Val Pro Gln Phe Leu Arg Trp Leu Asn Glu Trp Ser Glu Glu		
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30	Phe Cys Arg Ile Lys Asn Ile Lys Ile Gly Asn Ile Lys Lys Ser Cys		
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	Thr Gly Glu Ser Asn Asn Lys His Cys Ser Arg Glu Gly Tyr Asp Cys		
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35	Asn Lys Thr Asn Leu Arg Leu Asn Glu Ile Phe Met Asp Leu Glu Cys		
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	Pro Arg Cys Ala Asp Asp Cys Lys Ser Tyr Glu Thr Trp Val Glu Lys		
	370	375	380
	Lys Lys Lys Glu Phe Asn Lys Gln Lys Lys Lys Tyr Glu Lys Glu Val		
	385	390	395
40	Asp Ala Thr Gln Asn Asn Asp Asn Asn Glu Asn Gly Ile Tyr Asn Lys		
	405	410	415
	Lys Phe Tyr Asp Glu Leu Lys Ser Ser Tyr Lys Glu Val Asn Ser Phe		
	420	425	430
	Phe Glu Leu Leu Asn Lys Gly Pro Ile Cys Glu His Ile Asp Lys Lys		
45	435	440	445
	Ile Pro Met Asp Tyr Asn Asn Thr Glu Lys Thr Phe Ser Arg Ser Glu		
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	Tyr Cys Lys Ser Cys Pro Ile Thr Asp Ile Leu Cys Asp Asp Asn Glu		
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	Asn Ile Arg Lys Asn Glu Asn Glu Thr Pro Ile Asp Ile Asp Ile Leu		
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55	Val Asn Val Asn Asn Lys Lys Val Ile Thr His Asp Leu Lys Asn Asn		
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	Tyr Glu Asn Cys Asp Leu Phe Lys Lys Leu Gly Glu Gln Lys Trp Lys		
	530	535	540
	Cys Lys Tyr Lys Cys Tyr Leu Asp Val Cys Glu Pro Arg Asn Leu Asp		
	545	550	555
			560

Ser Asn Ile Tyr Asn Glu Arg Tyr Ile Ser Ile Lys Val Leu Phe Lys  
                   565                     570                     575  
 Arg Trp Leu Glu Tyr Phe Leu Glu Asp Tyr Asn Lys Leu Lys Glu Lys  
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 5 Leu Asn Pro Cys Met Tyr Asn Val Gln Glu Ile Val Cys Ile Asn Glu  
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 Cys Lys Gln Asn Cys Glu Cys Val Glu Lys Trp Ile Lys Glu Lys Arg  
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 Glu Glu Trp Lys Lys Ile Lys Asp Arg Tyr Val Gln Gln Tyr Glu Ser  
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 Gly Lys Pro Cys Asn Asn Asn Asp Val Ile Asn Ile Leu Leu Asn Arg  
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 Leu Glu Lys Gln Ile Asp Asn Cys Lys Lys Lys His Glu Glu Lys Gly  
 20 705                     710                     715                     720  
 Glu Lys Pro Cys Val Asp Ile Pro Lys Leu Leu Asn Asp Glu Asp Glu  
                   725                     730                     735  
 Asp Glu Asp Asp Glu Thr Pro Arg Ala His Asn Pro Cys Val Asp  
                   740                     745                     750  
 25 Lys Asn Asp Ser Gln Pro Thr Lys Thr Val Ser Tyr Ile Ala Arg Gln  
                   755                     760                     765  
 Met His Arg Arg Ala Lys Ala Gln Met Thr Lys Asn Ser Val Val Asp  
                   770                     775                     780  
 Gly Asp Asn Lys Leu Glu Gly Asp Ile Phe Lys Val Thr Phe Arg Asn  
 30 785                     790                     795                     800  
 Gly Gly Val Gly Lys Asn Leu Asn Gly Asp Ile Cys Lys Ile Asp Lys  
                   805                     810                     815  
 Thr Tyr Ser Asn Asp Ser Arg Gly Thr Pro Thr Asp Gly Pro Cys Glu  
                   820                     825                     830  
 35 Gly Lys Gly Asp Arg Phe Lys Ile Gly Thr Asp Trp Gln Gly Asp Ser  
                   835                     840                     845  
 Phe Val Asn Pro Gln Tyr Arg Gly Ile Tyr Met Pro Pro Arg Arg Gln  
                   850                     855                     860  
 His Phe Cys Thr Ser Asn Leu Glu Lys Leu Asp Val Ser Arg Val Ile  
 40 865                     870                     875                     880  
 Arg Asn Gly Asn Ala Ser Asn Ser Leu Leu Gly Asp Val Leu Leu Ala  
                   885                     890                     895  
 Ala Lys Tyr Glu Ala Glu Arg Thr Lys Asn His Tyr Val Ser Lys Lys  
                   900                     905                     910  
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 Leu Gly Asp Ile Ile Arg Gly Lys Asp Met Trp Asp Lys Asn His Gly  
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 Glu Lys Lys Thr Gln Glu Asn Leu Glu Arg Ile Phe Ala Lys Ile Lys  
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 Glu Gln Leu Leu Asn Ser Ser Ile Lys Asp Lys Tyr Lys Asp Asp Asp  
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 Lys Ala Thr Pro Lys Tyr Lys Gln Leu Arg Glu Asp Trp Trp Glu Ala  
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 55 Asn Arg Ser Gln Val Trp Glu Ala Met Gln Cys Pro Pro Lys Asn Gly  
                   995                     1000                     1005  
 Thr Phe Pro Cys Lys Ser Asp His Thr Pro Leu His Asp Tyr Ile Pro  
                   1010                     1015                     1020  
 Gln Arg Leu Arg Trp Met Thr Glu Trp Ala Glu Trp Tyr Cys Lys Glu

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	Gln Ser Arg Leu Tyr Gly Glu Leu Val Glu	Thr Cys Gly Lys Cys Met		
	1045	1050		1055
	His Lys Gly Lys Cys Lys Gln Gly Asn	Gly His Cys Val Thr Cys Lys		
5	1060	1065	1070	
	Pro Ala Cys Glu Lys Tyr Lys Phe Ile Asn	Thr Trp Gln Pro Gln		
	1075	1080	1085	
	Trp Lys Gln Met Glu Gln Lys Tyr Ser Gln	Leu Tyr Glu Glu Ala Lys		
	1090	1095	1100	
10	Lys Tyr Asn Asp Ser Ser Arg Lys Asp	Thr Thr Asn Lys Asp Asp Tyr		
	1105	1110	1115	1120
	Val Leu Gln Phe Leu Asn Lys Leu Leu	Thr Gln Asn Lys Gly Asn Lys		
	1125	1130		1135
	Thr Tyr Asp Thr Ala Glu Gly Tyr Val	His Gln Glu Ala His Ile Ser		
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	Asp Cys Gln Lys Gln Thr Gln Phe Cys	Lys Lys Arg Asn Gly Glu Ile		
	1155	1160	1165	
	Pro Ser Ser Asp Thr Glu Thr Asp Asn Asn	Tyr Ala Phe Arg Pro Gln		
	1170	1175	1180	
20	Pro His Asp His Asp Glu Val Cys Glu	Cys Asn Thr Arg Gln Lys Thr		
	1185	1190	1195	1200
	Lys Val Arg Lys Lys Lys Val Asp	Ala Cys Glu Met Ala Lys		
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	Thr Leu Leu His Asn Asn Asp Gly	Thr Ile Arg Ile Gly Gln Cys Lys		
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	Arg Lys Asp Glu Gly Asn Ala Glu	Tyr Pro Lys Trp Asp Cys Asn Ser		
	1235	1240	1245	
	Gln Ile His Thr Thr His Asn Gly	Ala Cys Met Pro Pro Arg Arg Gln		
	1250	1255	1260	
30	Lys Leu Cys Val Tyr Phe Phe Ala Asn	Pro Ser Gln Ile Gly Ser Ile		
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	Asn Lys Gln Asp Asn Leu Arg Lys Ala	Phe Ile Ile Ser Ala Ala Ala		
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	Glu Thr Phe Arg Ser Trp Gln Tyr	Tyr Lys Ser Lys Asn Gly Gly Glu		
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	Asn Leu Gln Thr Gln Leu Lys Asp	Gly Thr Ile Pro Asp Asp Phe Lys		
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	Arg Gln Met Phe Tyr Thr Tyr Gly	Asp Tyr Arg Asp Phe Leu Phe Gly		
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40	Thr Asp Ile Ser Lys Gly Leu	Gly Glu Gly Thr Ala Leu Glu Lys Gln		
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	Ile Asn Ile Leu Phe Pro Asn Gly	Val Arg Lys Ile Pro Asn Glu Lys		
	1365	1370	1375	
	Thr Arg Glu Lys Trp Trp Thr Asp	His Gly Pro Glu Ile Trp Lys Gly		
45	1380	1385	1390	
	Met Leu Cys Ala Leu Thr Asn Gly	Leu Ser Glu Ser Glu Lys Lys Thr		
	1395	1400	1405	
	Lys Ile Phe Asp Asp Tyr Ser His	Asp Lys Val Asn Gln Ser Lys Asn		
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50	Gly Asn Pro Ser Leu Glu Asp Phe Ala	Lys Lys Pro Gln Phe Phe Arg		
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	Trp Phe Ile Glu Trp Ser Asp	Glu Phe Cys Arg Glu Arg Lys Lys		
	1445	1450	1455	
	Glu Glu Glu Val Glu Arg Asp Cys	Lys Asp Glu Tyr Glu Gly Cys Glu		
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	Lys Glu Lys Asn Gly Lys Cys Val	Thr Ala Cys Lys Ala Tyr Lys Glu		
	1475	1480	1485	
	Tyr Ile Thr Asn Lys Lys Glu	Glu Tyr Asp Ser Gln Lys Gly Lys Phe		
	1490	1495	1500	

Asp Val Glu Lys Thr Glu Lys Lys Gln Gly Tyr Glu Asp Tyr Ser Glu  
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 Lys Gln Ala Ser Glu Tyr Leu Lys Glu Lys Cys Ile Lys Ser Ser Cys  
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 5 Asn Cys Met Lys Lys Val Thr Glu Ile Ser Asn Tyr Trp Thr Asn Pro  
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 His Lys Thr Tyr Asp Thr Glu Asn Leu Gly Ile Lys Cys Glu Cys Pro  
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 Pro Ser Pro Cys Thr Ile Val Asp Gly Ile Leu Ser Pro Gln Asn Ser  
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 Ser Ser Tyr Ala Glu Gly Cys Lys Trp Lys Tyr Gly Lys Met Ser Gln  
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 Gly Gly Thr Glu Trp Asp Cys Ser Lys Lys Ser Gly Gly Glu Gly  
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 15 Asn Glu Asp Gly Asp Val Val Cys Ile Pro Pro Arg Arg Arg Arg Leu  
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 Tyr Val Lys Asn Leu Gln Asp Leu Thr Gly Glu Glu Ser Leu Val Asp  
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 Trp His Glu Phe Lys Lys Glu Lys Glu Arg Glu Glu Lys Glu Lys Asn  
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 25 Gln Leu Lys Asn Gly Glu Ile Asp Asp Glu Phe Lys Arg Gln Met Phe  
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 Tyr Thr Phe Ala Asp Tyr Arg Asp Ile Cys Leu Gly Lys Asp Ile Gly  
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 Asn Asp Val Asp Gly Ile Asn Glu Lys Ile Asp Thr Ile Leu Gln Lys  
 30 1730 1735 1740  
 Asn Gly Lys Pro Asn Asn Ile Glu Glu Tyr Lys Lys Trp Trp Gln Lys  
 1745 1750 1755 1760  
 His Gly His Glu Ile Trp Glu Gly Met Leu Cys Ala Leu Ser Tyr Asn  
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 35 Thr Glu Thr Lys Glu Met Asp Lys Glu Leu Arg Asn Lys Leu Thr Glu  
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 Gly Pro Ile Gly Asn Thr Lys Leu Glu Lys Phe Ala Ser Arg Pro Pro  
 40 1810 1815 1820  
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 Thr His Lys Leu Glu Lys Ile Gln Asn Glu Cys Lys Gly Val Ser Gly  
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 45 Thr Asn Gln Cys Asp Asp Asp Gly Phe Asp Cys Asp Glu Met Cys Pro  
 1860 1865 1870  
 Lys Lys Asp Gly Ser Phe Glu Thr Phe Lys Cys Leu Ser Cys Ala Lys  
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 Ser Cys Arg Phe Tyr Lys Lys Trp Ile Ser Arg Lys Lys Glu Glu Phe  
 50 1890 1895 1900  
 Asp Lys Gln Ser Lys Lys Tyr Glu Asn Glu Ile Asp Asp Val Lys His  
 1905 1910 1915 1920  
 Asn Ser Asp Asn Ile Tyr Gly Lys Asp Phe Leu Glu Thr Leu Asp Gln  
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 55 Gln Tyr Lys Ser Val Glu Leu Phe Leu Glu Lys Val Lys Gly Pro Cys  
 1940 1945 1950  
 Ser Ile Asn Asn Asn Glu Glu Cys Lys Ile Asp Phe Asn Lys Pro  
 1955 1960 1965  
 Lys Asp Thr Phe Gly His Ala Lys Asn Cys Gly Pro Cys Ser Glu Ile

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	Cys Asn Lys Thr Thr Phe Lys Phe Thr Glu Asp Asn Lys Asp Thr Lys		
5	2005	2010	2015
	Glu Asp Ser Glu Gln Leu Gly Met Leu Ile Ser Asp Asn Thr Val Gln		
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	Asn Phe Ala Asp Gly Leu Gln Asn Asp Cys Lys Asp Ala Asp Ile Phe		
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	Asp Ile Cys Ser Leu Lys Thr Ser His Gly Glu Asn Asn Tyr Lys Gln		
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	Asn Ile Leu Ile Arg Ala Leu Phe Lys Arg Trp Leu Glu His Phe Leu		
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	Glu Asp Tyr Asn Lys Ile Asn Asp Lys Ile Ser His Cys Met Lys Asn		
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	Gly Glu Gly Ser Thr Cys Ile Lys Gly Cys Glu Ile Lys Cys Asn Cys		
	2115	2120	2125
20	Val Ser Asn Trp Ile Lys Lys Lys Thr Leu Glu Trp Glu Ile Val Arg		
	2130	2135	2140
	Asp Arg Phe Phe Lys Gln Tyr Asn Val Asp Ser Glu Lys Ser Phe Thr		
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	Val Lys Ser Phe Leu Glu Gln Ala Pro Phe Asp Ser Asp Val Gln Lys		
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	Ala Ile Lys Pro Phe Glu Lys Leu Arg Asp Phe Glu Asp Ser Ile Val		
	2180	2185	2190
	Cys Asn Gly Thr Thr Ser Ala Arg Lys Glu Lys Gly Thr Glu Lys Asp		
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30	Val Val Ile Cys Leu Leu Asp Lys Leu Gln Lys Gln Ile Glu Thr Cys		
	2210	2215	2220
	Gln Thr Lys His Lys Glu Thr Ser Gly Asn Thr Cys Ser Pro Pro Pro		
	2225	2230	2235
	Asn Pro Asp Thr Gln Thr Asp Thr Pro Leu Pro Leu Glu Ser Phe Pro		
35	2245	2250	2255
	Pro Pro Phe Cys Asn Val Pro Pro Asn Pro Cys Gly Asp Lys Asp Ala		
	2260	2265	2270
	Thr Asn Val Val Gly Val Glu Val Leu Ala Lys Glu Met Gln Glu Ala		
	2275	2280	2285
40	Ala His Lys Ser Met Leu Ser Arg Ser Ala Val Asp Ser Gly Lys Gly		
	2290	2295	2300
	Asp Lys Gly Glu Ser Ser Ser Gly Lys Ser Ser Leu Glu Gly Asp Ile		
	2305	2310	2315
	Ser Leu Ala Glu Phe Lys Asn Gly Phe Asn Pro Ser Gly Leu Lys Asn		
45	2325	2330	2335
	Val Cys Gln Ile Thr Glu Lys His Ser Tyr Ala Asn Gly Ala Ser Lys		
	2340	2345	2350
	Asp Pro Cys Asn Gly Lys Gly Asn Gly Lys Asp Gln Arg Phe Lys Ile		
	2355	2360	2365
50	Glu Thr Gln Trp Lys Asp Thr Gly Lys Ser Gly Lys His Val Asp Val		
	2370	2375	2380
	Tyr Leu Pro Pro Arg Arg Glu His Ile Cys Thr Ser Asn Leu Glu Tyr		
	2385	2390	2395
	Leu Leu Lys Gly Asn Ser Asp Gln Ile Met Lys Val Gly Asn Asn Lys		
55	2405	2410	2415
	Ile Asn His Ser Phe Leu Gly Glu Val Leu Leu Ala Ala Lys Tyr Glu		
	2420	2425	2430
	Ala Glu Phe Ile Lys Thr Asn Tyr Thr Arg Leu Asn Gly Gln Asn Asp		
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5	Leu	Glu	Arg	Asp	Leu	Val	Lys	Ile	Phe	Gly	Lys	Ile	Lys	Glu	Gly	Ile
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	Glu	Ala	Met	Gln	Cys	Lys	Thr	Thr	Ile	Pro	Pro	Val	Thr	Thr	Ser	Cys
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	Asp	Thr	Thr	Thr	Val	Thr	Pro	Leu	Val	Asp	Tyr	Ile	Pro	Gln	Arg	Leu
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20	Cys	Met	Lys	Gly	Asp	Ser	Lys	Cys	Glu	Asn	Cys	Thr	Lys	Ala	Cys	Lys
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40	Asp	Ala	Leu	Pro	Val	Leu	Pro	Pro	Glu	Glu	Ile	Glu	Gln	Glu	Glu	Glu
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	Pro	Glu	Glu	Thr	Ser	Val	Asp	Thr	Thr	Gln	Asp	Glu	Glu	Glu	Pro	Ala
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50	Pro	Pro	Lys	Ser	Lys	Pro	Pro	Asp	Gly	Asp	Arg	Gly	Val	Gly	Arg	Ser
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	Pro	Pro	Pro	Pro	Pro	Leu	Pro	Pro	Leu	Lys	Thr	Ala	Leu	Met	Ser	

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Ser	Thr Ile Met Trp Ser Val Gly Ile Gly Phe Ala Ala Ile Ser Tyr		
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Phe	Leu Leu Lys Lys Lys Pro Lys Ser Pro Val Asp Leu Ile Arg Val		
5 2945	2950	2955	2960
Ile	Asp Ile His Lys Gly Asp Tyr Gly Ile Pro Thr Leu Glu Ser Lys		
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Asn	Arg Tyr Ile Pro Tyr Val Ser Asp Thr Tyr Lys Gly Lys Thr Tyr		
2980	2985	2990	
10 Ile	Tyr Met Glu Gly Asp Thr Ser Gly Asp Glu Lys Tyr Gly Phe Met		
2995	3000	3005	
Ser	Asp Thr Thr Asp Ile Thr Ser Ser Glu Ser Glu Tyr Glu Glu Leu		
3010	3015	3020	
Asp	Ile Asn Asp Ile Tyr Val Pro Gly Ser Pro Lys Tyr Lys Thr Leu		
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 35 Asp Asn Asn Ser Lys Asp Ser Cys Pro Pro Ser Val Asp Thr Lys Thr  
 725 730 735  
 Asn Pro Cys Ala Lys Pro Pro Gly Ser Lys Pro Thr Lys Ser Val Lys  
 740 745 750  
 Gln Leu Ala Glu His Met Gln Gln Lys Ala Gln Lys Leu Leu Gly Thr  
 40 755 760 765  
 Arg Gly Gly Glu Ser Lys Leu Lys Gly Asp Ala Thr Arg Gly Thr Tyr  
 770 775 780  
 Asn Leu Gly Gly Gln Gly Asn Thr Leu Asn Gly Asp Ile Cys Lys Ile  
 785 790 795 800  
 45 Thr Lys Asn His Thr Asn Asp Ser Arg Pro Asn Gly Glu Pro Cys Thr  
 805 810 815  
 Gly Lys Asp Lys Val Lys Asn Gly Phe Arg Leu Lys Ile Gly Thr Pro  
 820 825 830  
 Trp Thr Asn Ile Val Gln Lys Lys Lys Lys Ser Tyr Lys Asp Phe  
 50 835 840 845  
 Tyr Leu Pro Pro Arg Arg Gln His Met Cys Thr Ser Asn Leu Glu Asn  
 850 855 860  
 Leu Ser Thr Ser Ser Lys Gly Leu Ser Asn Gly Ser Phe Ala Ser His  
 865 870 875 880  
 55 Ser Leu Leu Gly Asp Val Leu Leu Ala Ala Lys Phe Glu Ala Gln Lys  
 885 890 895  
 Ile Ile Leu Val Tyr Lys Asn Lys Asn Asn Ile Asn Ile Arg Lys Arg  
 900 905 910  
 Ile Thr Asp Pro Asn Asp Gln Ala Thr Val Cys Arg Ala Ile Arg Tyr

	915	920	925
	Ser Phe Ala Asp Leu Gly Asp Ile Ile Arg Gly Lys Asp Met Trp Asn		
	930	935	940
	Ile Asn Ser Asp Ala Lys Asp Leu Gln Asp Arg Leu Glu Lys Ile Phe		
5	945	950	955
	Lys Thr Ile Asn Glu Lys Leu Pro Asn Glu Ile Gln Lys Arg Tyr Thr		
	965	970	975
	Asn Arg Glu Asn Lys His Leu Asp Leu Arg Ser Asp Trp Trp Glu Ala		
	980	985	990
10	Asn Arg His Gln Val Trp Arg Ala Met Lys Cys Ala Thr Lys Gly Ile		
	995	1000	1005
	Ser Asn Asn Asn Cys Asn Gly Ile Pro Ile Glu Asp Tyr Ile Pro Gln		
	1010	1015	1020
	Arg Leu Arg Trp Met Thr Glu Trp Ala Glu Trp Tyr Cys Lys Lys Gln		
15	1025	1030	1035
	Ser Gln Glu Tyr Glu Lys Leu Glu Lys Cys Gly Met Cys Thr Gly		
	1045	1050	1055
	Lys Gly Gln Gly Asp Gly Lys Asp Cys Thr Gln Lys Asp Lys Glu Cys		
	1060	1065	1070
20	Ser Pro Cys Lys Lys Ala Cys Asp Ala Tyr Lys Lys Glu Ile Glu Lys		
	1075	1080	1085
	Trp Glu Lys Gln Trp Lys Thr Val Ser Ala Ile Tyr Gln Ile Leu Tyr		
	1090	1095	1100
	Ala Lys Ala Arg Ile Val Ala Ser Asn Gly Gly Pro Gly Tyr Tyr Asn		
25	1105	1110	1115
	Thr Glu Val Gln Lys Lys Asp Arg Ser Val Tyr Asp Phe Leu Tyr Glu		
	1125	1130	1135
	Leu His Leu Gln Asn Gly Gly Lys Lys Gly Pro Pro Pro Ala Thr His		
	1140	1145	1150
30	Pro Tyr Lys Ser Val Asn Thr Arg Asp Lys Arg Asp Ala Thr Asp Asp		
	1155	1160	1165
	Thr Thr Pro Thr Val Tyr Ser Thr Ala Ala Gly Tyr Val His Gln Glu		
	1170	1175	1180
	Ala His Ile Gly Asp Cys Lys Glu Gln His Val Phe Cys Asp Asn Asn		
35	1185	1190	1195
	Gly Asn Lys Glu Lys Tyr Ala Phe Lys Asn Pro Pro Asn Val Tyr Val		
	1205	1210	1215
	Glu Ala Cys Lys Cys Met Thr Arg Glu Ala Pro Pro Pro Pro Thr Thr		
	1220	1225	1230
40	Pro Ser Thr Pro Asn Pro Cys Ala Glu Thr Gly Val His Thr Ile		
	1235	1240	1245
	Lys Thr Val Thr Asp Val Ala Lys Ile Leu Gln Gly Glu Ala Asn Glu		
	1250	1255	1260
	Thr Met Leu Lys Asn Ser Ser Asn Gly Asn Asp Lys Asp Glu Ser Lys		
45	1265	1270	1275
	Leu Lys Gly Lys Ala Glu Glu Gly Asp Tyr Ser Arg Gly Gly Thr Pro		
	1285	1290	1295
	Ser Asp Phe Asn Asn Asn Leu Cys Gly Ile Thr Gln Lys His Ser Asn		
	1300	1305	1310
50	Ala His Asn Asp Ser Gln Gln Pro Cys Tyr Gly Lys Asp Gln Lys Arg		
	1315	1320	1325
	Phe Asn Val Gly Thr Glu Trp Ser Phe Lys Asp Asn His Arg Lys Arg		
	1330	1335	1340
	Thr His Pro Glu Ala Tyr Met Pro Pro Arg Arg Glu His Ile Cys Thr		
55	1345	1350	1355
	Ser Asn Leu Glu Tyr Leu Ile His Lys Arg Lys Lys Pro Ile Ile Glu		
	1365	1370	1375
	Gly Asp Pro Asn Lys Ile Ile His Ser Leu Leu Gly Asp Val Leu Leu		
	1380	1385	1390

Ala Ala Lys Tyr Glu Ala Glu Asn Ile Lys Lys Leu Tyr Glu Glu Asn  
 1395 1400 1405  
 Asn Asn Arg Lys Asp Gln Glu Gly Ile Cys Arg Ala Met Lys Tyr Ser  
 1410 1415 1420  
 5 Phe Ala Asp Ile Gly Asp Ile Ile Arg Gly Lys Asp Met Trp Ile Glu  
 1425 1430 1435 1440  
 Asn Asn Asp Ala Lys Arg Leu Gln Thr Asn Leu Lys Glu Ile Phe Thr  
 1445 1450 1455  
 Lys Ile Lys Glu Lys Thr Gly Thr Tyr Asn Glu Asp Asn Asp  
 10 1460 1465 1470  
 Pro Tyr Leu Lys Leu Arg Ala Asp Trp Trp Glu Ala Asn Arg Ala Lys  
 1475 1480 1485  
 Val Trp Lys Ala Met Lys Cys Lys Thr Asn Gly Val Asp Ile Thr Cys  
 1490 1495 1500  
 15 Asp Ser Asp His Thr Pro Leu Asp Asp Tyr Ile Pro Gln Arg Leu Arg  
 1505 1510 1515 1520  
 Trp Met Thr Glu Trp Ala Glu Trp Tyr Cys Lys Ala Gln Ser Gln Glu  
 1525 1530 1535  
 Tyr Lys Lys Leu Glu Glu Lys Cys Ser Gln Cys Lys Ser Lys Gly Lys  
 20 1540 1545 1550  
 Gly Gly Asn Glu Cys Tyr Arg Glu Thr Lys Glu Cys Asn Asp Cys Lys  
 1555 1560 1565  
 Gln Ala Cys Glu Glu Tyr Lys Arg Lys Ile Lys Thr Trp Ala Asp Gln  
 1570 1575 1580  
 25 Trp Lys Val Ile Ser Asn Lys Tyr Glu Asp Leu Tyr Lys Lys Ala Gln  
 1585 1590 1595 1600  
 Asn Pro Thr Asn Ala Val Leu Lys Asp Asn Lys Asp Glu Lys Asp Lys  
 1605 1610 1615  
 Asn Val Ile Asp Phe Leu Thr Gln Leu Gln Lys Ala Asn Asn Gly Glu  
 30 1620 1625 1630  
 Lys Thr Gly Val His Thr Val Tyr Ser Thr Ala Ala Gly Tyr Ile His  
 1635 1640 1645  
 Gln Glu Ala Arg Thr Arg Glu Cys Gln Glu Gln Arg Glu Phe Cys Asp  
 1650 1655 1660  
 35 Lys Lys Asn Gly Ile Asp Asn Thr Ser Tyr Ala Phe Lys Asp Pro Pro  
 1665 1670 1675 1680  
 His Gly Tyr Ala Thr Ala Cys Asp Cys Ile Asn Arg Ser Gln Thr Glu  
 1685 1690 1695  
 Glu Pro Lys Lys Glu Glu Asn Val Glu Ser Ala Cys Lys Ile Val  
 40 1700 1705 1710  
 Glu Glu Val Leu Ser Lys Pro Arg Asp Lys Thr Thr Gly Gly Ile Asp  
 1715 1720 1725  
 His Cys Asn Pro Lys Tyr Tyr Pro Arg Lys Glu Asn Tyr Pro Gly Trp  
 1730 1735 1740  
 45 Asn Cys Thr Pro Gly Gln Phe Lys Ser Gly His Ala Gly Ala Cys Met  
 1745 1750 1755 1760  
 Pro Pro Arg Arg Ile Lys Leu Cys Val Ile Asn Leu Gln Tyr Leu Asn  
 1765 1770 1775  
 Glu Lys Lys Ser Pro Glu Glu Leu Arg Lys Ala Phe Ile Gln Cys Ala  
 50 1780 1785 1790  
 Ala Ile Glu Thr Tyr Trp Leu Trp Gln Lys Tyr Lys Lys Asp Lys Asn  
 1795 1800 1805  
 Gly Gly Val Ala Gln Ala Lys Leu Asn Ser Gly Thr Ile Pro Asp Asp  
 1810 1815 1820  
 55 Phe Lys Arg Gln Met Phe Tyr Thr Phe Gly Asp Tyr Arg Asp Leu Cys  
 1825 1830 1835 1840  
 Leu Asp Thr Asp Ile Ser Ser Lys Ala Asp Thr Ser Thr Gly Val Gly  
 1845 1850 1855  
 Lys Val Lys Ile Asn Ile Asp Ser Val Phe Gln Lys Ile Asp Ile Thr

	1860	1865	1870
	Asn Val Glu Gln Arg Lys Pro Trp Trp Gly Lys Asn Ala Glu Ala Ile		
	1875	1880	1885
	Trp Asp Gly Met Leu Cys Ala Leu Ser Tyr Asn Thr Thr Asn Lys Asn		
5	1890	1895	1900
	Met Asp Tyr Asn Ala His Thr Lys Leu Asn Pro Thr Tyr Gly Tyr Asn		
	1905	1910	1915
	Ala Ile Lys Ser Glu Leu Asp Phe Val Asn Arg Pro Gln Phe Leu		
	1925	1930	1935
10	Arg Trp Phe Thr Glu Trp Ser Asp Glu Phe Cys Thr Glu Arg Ser Ile		
	1940	1945	1950
	Lys Ile Lys Glu Leu Glu Thr Lys Cys Asn Asp Cys Thr Val Ser Glu		
	1955	1960	1965
	Ser Gly Thr Ser Asp Ala Thr Gly Asn Lys Thr Cys Asp Asp Lys Asp		
15	1970	1975	1980
	Lys Cys Asp Glu Cys Lys Arg Ala Cys Thr Thr Tyr Lys Thr Trp Leu		
	1985	1990	1995
	Lys Asn Trp Lys Thr Gln Tyr Lys Thr Gln Ser Lys Lys Tyr Phe Asp		
	2005	2010	2015
20	Asp Lys Arg Lys Glu Leu Tyr Lys Ser Ile Asp Asp Val Ala Ser Ser		
	2020	2025	2030
	Thr Gln Ala Tyr Gln Tyr Leu His Ala Gln Leu Lys Lys Leu Cys Gly		
	2035	2040	2045
	Asn Ala Asp Cys Lys Cys Met Asp Gly Glu Ser Lys Glu Thr Thr Gly		
25	2050	2055	2060
	Gln Pro Asp Asn Ser His Asp Ser His Met Pro Ala Ser Leu Asp Asp		
	2065	2070	2075
	Glu Pro Glu Glu Val Asn Gly Lys Cys Asn Cys Lys Val Lys His Arg		
	2085	2090	2095
30	Pro Gln Pro Pro Leu Ala Leu Pro Pro Pro Ala Pro Ser Gly Pro Pro		
	2100	2105	2110
	Ala Glu Asp Gln Ile Glu His Asp Asn Arg Gly Arg Ser Glu Arg Gly		
	2115	2120	2125
	Asp Gln Gly Pro Leu Pro Ala Arg Pro Pro Pro Pro Pro Gln Ala Ala		
35	2130	2135	2140
	Gln Pro Pro Gln Pro Lys Pro Lys Arg Thr Gly Glu Gly Leu Gly Arg		
	2145	2150	2155
	Asn Leu Pro Pro Ala Asp Arg Asn Thr Asn Leu Ser Asp Ser Glu Glu		
	2165	2170	2175
40	Glu Asp Asp Glu Asp Asp Asp Glu Val Gln Glu Glu Glu Glu Thr Pro		
	2180	2185	2190
	Pro Ser Glu Ala Glu Glu Gly Glu Gly His Val Glu Thr Glu Glu Glu		
	2195	2200	2205
	Thr Lys Pro Val Lys Glu Lys Thr Glu Gly Ala Gly Ala Thr Glu Val		
45	2210	2215	2220
	Thr Lys Gln Gly Ser Ala Pro Thr Ala Thr Thr Pro Thr Val Glu Asp		
	2225	2230	2235
	Ile Cys Ala Thr Val Ala Lys Ala Leu Lys Gly Asp Lys Ser Leu Asn		
	2245	2250	2255
50	Ala Ala Cys Ala Leu Lys Tyr Gly Lys Asn Asn Ser Arg Leu Gly Trp		
	2260	2265	2270
	Lys Cys Ile Pro Thr Ser Gly Asp Lys Thr Asp Thr Ser Glu Asn Gly		
	2275	2280	2285
	Ala Pro Arg Arg Ala Arg Ser Ala His Gly Gly Lys Ser Asp Ser Glu		
55	2290	2295	2300
	Lys Gly Ser Ile Cys Val Pro Pro Arg Arg Arg Arg Leu Tyr Ile Lys		
	2305	2310	2315
	Lys Ile Val Asp Trp Ala Glu Ser Gln Ser Lys Thr Val Thr Ser Val		
	2325	2330	2335

Asn Gly Asp Gly Asn Gly Ser Gln Glu Val Val Ser Val Asn Gly Ala  
 2340 2345 2350  
 Ser Glu Ser Gly Gly Ser Gly Ser Gly Thr Glu Ser Gln Ala Ser Asp  
 2355 2360 2365  
 5 Val Ser Gln Gly Asn Gly Ala Ser Thr Ser Pro Gln Val Ala Leu Leu  
 2370 2375 2380  
 His Ala Phe Val Lys Ser Ala Ala Ile Glu Thr Phe Phe Ala Trp His  
 2385 2390 2395 2400  
 Lys Tyr Lys Val Asp Lys Glu Ile Glu Glu Lys Glu Lys Gln Ala Ala  
 10 2405 2410 2415  
 Gln Asn His Leu Val Gln Arg Lys Thr Ser Glu Asn Pro Gln Lys Lys  
 2420 2425 2430  
 Leu Glu Gly Glu Ile Pro Glu Asp Phe Lys Arg Gln Met Phe Tyr  
 2435 2440 2445  
 15 Thr Leu Gly Asp Tyr Arg Asp Ile Leu Val Gly Asp Lys Thr Met Ile  
 2450 2455 2460  
 Glu Ala Leu Glu Lys Ser Gly Asp Thr Lys Ile Glu Asp Ile Ser Glu  
 2465 2470 2475 2480  
 Lys Ile Pro Lys Ile Leu Asp Gly Glu Asn Asn Lys Ala Ala Gly Gly  
 20 2485 2490 2495  
 Gly Pro Lys Gln Pro Asn Ser Gly Lys Thr Pro Gln Glu Trp Trp Lys  
 2500 2505 2510  
 Glu Asn Ala Lys His Ile Trp His Gly Met Ile Cys Ala Leu Thr Tyr  
 2515 2520 2525  
 25 Asn Thr Asp Ser Asn Gly Lys Asp Lys Lys Ile Gln Gln Val Lys Ala  
 2530 2535 2540  
 Thr Asp Asn Thr Asp Leu Phe Gln Lys Leu Lys Lys Asp Asn Asp Tyr  
 2545 2550 2555 2560  
 Glu Thr Val Ser Phe Gly Ala Ser Gly Thr Gly Ala Lys Ser Asn Asp  
 30 2565 2570 2575  
 Asp Thr Lys Leu Lys Asn Phe Val Val Arg Pro Thr Tyr Phe Arg Trp  
 2580 2585 2590  
 Leu Glu Glu Trp Gly Glu Glu Phe Cys Arg Lys Gln Lys His Lys Leu  
 2595 2600 2605  
 35 Tyr Ile Ile Lys Lys Asp Cys Arg Asp Asn Lys Phe Cys Ser Gly Asp  
 2610 2615 2620  
 Gly Leu Arg Cys Asp Glu Lys Val Pro Asp Lys Lys Asp Ile Phe Lys  
 2625 2630 2635 2640  
 His Phe Asp Cys Pro Ser Cys Ala Arg His Cys Arg Ser Tyr Arg Lys  
 40 2645 2650 2655  
 Trp Ile Glu Arg Lys Lys Thr Glu Tyr Glu Lys Gln Glu Ser Ala Tyr  
 2660 2665 2670  
 Ser Lys Gln Lys Ser Asn Tyr Val Asn Gly Ser Asn Gly Asp Gly Gly  
 2675 2680 2685  
 45 Asn Asn Asn Asp Lys Glu Phe Tyr Thr Lys Leu Glu Thr Cys Thr Lys  
 2690 2695 2700  
 Ala Thr Asn Phe Leu Glu Ser Leu Lys Gly Gln Cys Ile Gly Asn Asn  
 2705 2710 2715 2720  
 Asn Gly Gly Thr Asp Ile Lys Phe Ser Asn Thr Asn Ile Thr Phe Gly  
 50 2725 2730 2735  
 Ser Ala Glu Asp Cys Lys Pro Cys Ser Glu Phe Lys Val Asn Cys Glu  
 2740 2745 2750  
 Asn Gly Ser Cys Gly Ser Ala Lys Gln Lys Asp Cys Pro Asn Asn Thr  
 2755 2760 2765  
 55 Ile Thr Ser Gln Asn Ile Lys Gly Leu Thr Asp Gln Val Asp Met Arg  
 2770 2775 2780  
 Val Ser Asp Asn Thr Glu Ser Gly Phe Glu Gly Asp Leu Gly Ile Cys  
 2785 2790 2795 2800  
 Gln Gly Ala Gly Ile Phe Lys Gly Ile Arg Lys Asp Glu Trp Lys Cys

	2805	2810	2815
	Gly Asp Phe Cys Gly Ile Asp Ile Cys Thr Leu Glu Lys Thr Asn Asn		
	2820	2825	2830
	Gly Lys Glu Ser Asp Lys Lys Tyr Ile Ile Met Lys Glu Phe Val Lys		
5	2835	2840	2845
	Arg Trp Leu Glu Tyr Phe Phe Glu Asp Tyr Asn Arg Ile Gln Lys Lys		
	2850	2855	2860
	Leu Lys Thr Cys Lys Glu Asn Gly Lys Gly Ser Thr Cys Ile Arg Ser		
	2865	2870	2875
10	Cys Val Asp Glu Trp Ile Lys Leu Lys Lys Asp Glu Trp Gln Lys Ile		
	2885	2890	2895
	Asn Ser Asn Tyr Leu Asp Gln Asn Thr Lys Glu Asn Pro Glu Gly Asn		
	2900	2905	2910
	Asn Leu Ser Ser Phe Leu Glu Asp Gly Pro Phe Lys Asn Glu Val Asp		
15	2915	2920	2925
	Lys Ala Ile Lys Pro Cys Gly Asn Leu Thr Asp Phe Lys Lys Ser Lys		
	2930	2935	2940
	Lys Cys Asn Gly Thr Ser Arg Ser Gly Asn Ser Glu Glu Ser Thr Lys		
	2945	2950	2955
20	Tyr Asp Gly Val Ile Cys Leu Leu Asp Asn Leu Lys Asn Ile Ile Lys		
	2965	2970	2975
	Thr Cys Gln Asn Val Pro Ser Gly Lys Pro Asp Thr Pro Cys Gln Lys		
	2980	2985	2990
	Ser Pro Ala Pro Val Gly Asp Asp Asp Pro Leu Glu Glu Glu Asn		
25	2995	3000	3005
	Pro Val Thr Gln Pro Asn Ile Cys Pro Gln Thr Ser Val Glu Glu Lys		
	3010	3015	3020
	Lys Lys Glu Glu Glu Lys Cys Asp Glu Lys Glu Glu Glu Glu		
	3025	3030	3035
30	Lys Glu Glu Glu Lys Asp Lys Gly Asp Glu Glu Val Lys Glu Glu Glu		
	3045	3050	3055
	Lys Asp Lys Gly Asp Glu Glu Glu Glu Ala Glu Glu Glu Glu Glu		
	3060	3065	3070
	Glu Glu Glu Thr Asp Ser His Ile Tyr Glu Asp Tyr Ser Asp Ser Asp		
35	3075	3080	3085
	Ala Glu Glu Asp Asp Glu Asp Glu Ala Val Thr Glu Ser Leu Ser Pro		
	3090	3095	3100
	Ser Glu Ser Gln Pro Lys Arg Leu Leu Arg Glu Phe Pro Ser Pro Glu		
	3105	3110	3115
40	Leu Lys Asn Ala Met Leu Phe Ser Thr Ile Leu Trp Met Val Gly Ile		
	3125	3130	3135
	Gly Phe Ala Ala Phe Thr Tyr Phe Phe Leu Lys		
	3140	3145	